STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES
PACIFIC CASCADE REGION

NOOTKA THINNING

ROAD PLAN

SECTION 20, 21, 27, 28, 34, TOWNSHIP 03 NORTH, RANGE 07 EAST, W.M.

CLARK COUNTY

YACOLT DISTRICT

AGREEMENT NO.: 30-074263

CONTRACT ADMINISTRATOR: Who is the Unit Forester

DATE: 08/01/2004

STAFF ENGINEER: Jim English

APPROVED BY: _____

DRAWN & COMPILED BY: Alicia Compton

SECTION 0 – SCOPE OF PROJECT

This project includes but is not limited to optional construction including:

clearing;
grubbing;
right-of-way debris disposal;
excavation and/or embankment to subgrade;
landing construction;
acquisition and installation of drainage structures;
acquisition, manufacture, and application of rock;
road deactivation;
grass seeding.

This project also includes but is not limited to reconstruction and optional reconstruction including:

right-of-way debris disposal;
clearing;
grubbing;
pulling and installing ditches;
cleaning ditches;
excavation and/or embankment to subgrade;
acquisition and installation of drainage structures;
acquisition, manufacture, and application of rock;
landing construction;
road deactivation;
grass seeding.

This project also includes but is not limited to pre-haul maintenance including:

brushing right-of-way;
removing fallen right-of-way debris;
pulling ditches;
cleaning ditches;
cleaning culvert inlets and outlets;
installing erosion control materials and sediment removal structures;
stabilizing embankment slope;
acquisition and installation of drainage structures;
acquisition and placement of riprap;
grading and shaping existing road surface and turnouts;
removing berms from road shoulders;
spot rocking;

SECTION 1 - GENERAL CLAUSES

1.1-1

Clauses in this plan apply to all construction, reconstruction, or deactivation including landings unless otherwise noted.

1.1-2

Reconstruction or pre-haul maintenance of the following roads is required. All roads shall be reconstructed or pre-haul maintained on the State's location and in accordance with this Road Plan.

Road	Stations	Type
CG-2020	MP 0.00 to MP 5.11	Pre-Haul Maintenance/Reconstruction *
CG-2024	0+00 to 9+91	Reconstruction

* Approximately 38 stations of the CG-2020 Road between MP 0.00 and MP 5.11 will require reconstruction, including the installation of ditches, culverts, and some reshaping of the road prism in accordance with dimensions shown on the TYPICAL SECTION SHEET. Remove only trees marked with orange paint. These areas are marked.

1.1-3

Construction or reconstruction of the following roads is not required. Roads used by the Purchaser shall be constructed or reconstructed on the State's location and in accordance with this Road Plan.

Road	Stations	Type
CG-2022	0+00 to 54+14	Reconstruction
CG-2022A	0+00 to 20+26	Reconstruction
CG-2022B	0+00 to 7+91	Reconstruction
CG-2024A	0+00 to 1+73	Construction
Spur A	0+00 to 8+17	Reconstruction
Spur B	0+00 to 5+14	Reconstruction
Spur C	0+00 to 3+67	Construction
Spur E	0+00 to 5+12	Reconstruction
Spur E	5+12 to 15+46	Construction

1.1-4

If the Purchaser desires a road location or design change, a revised Road Plan shall be submitted to the State for consideration.

1.1-5

On this plan quantities are minimum acceptable values. Additional quantities required by the State because of hidden conditions or Purchaser's choice of construction season or techniques shall be at the Purchaser's expense. Hidden conditions include, but are not limited to: solid subsurface rock, subsurface springs, saturated ground, and unstable soil.

1.2-1

The construction, reconstruction, deactivation, or pre-haul maintenance of any roads specified herein shall not be permitted between November 1 and April 15 unless authority to do so is granted, in writing, by the Contract Administrator.

1.2-2

Purchaser shall not use roads constructed, reconstructed, or pre-haul maintained under this Road Plan for hauling, other than timber cut on the right-of-way, without written approval from the Contract Administrator.

1.2-6

Pioneering shall not extend past construction that will be completed during the current construction season. Drainage shall be provided on all uncompleted construction as approved, in writing, by the Contract Administrator.

Culverts shall be installed in completed subgrade as construction progresses.

Subgrade, ditches, and culvert installations shall be completed and are subject to written approval by the Contract Administrator prior to rock application, and/or timber haul.

1.3-2

Rock application on optional roads is not required as long as hauling is done during dry weather conditions. Written approval by the Contract Administrator is required. Hauling shall be suspended when wheel track rutting exceeds 6 inches unless Purchaser elects to correct the situation at his/her own expense. Corrective measures and continued operations are subject to written approval by the Contract Administrator. If purchaser elects to haul during wet conditions, then rock application will be required.

1.4-3

Reference points (R.P.'s) that are moved or damaged at any time during construction shall be reset in their original locations by the Purchaser. Excavation and embankment shall not proceed on road segments controlled by said R.P.'s until all moved or damaged R.P.'s are reset.

1.5-1

Maintenance on roads listed in Contract Clauses C-50 (Purchaser Road Maintenance and Repair) and C-60 (Designated Road Maintainer) shall be performed in accordance with Forest Access Road Maintenance Specifications.

1.5-3

On all roads, snowplowing shall not be permitted unless authorized, in writing, by the Contract Administrator.

SECTION 2 - CLEARING

2.1-1

Fell all vegetative material larger than 6 inches DBH or over 20 feet high between the marked right-of-way boundaries and within waste areas or if not marked in the field, between clearing limits specified on TYPICAL SECTION SHEET.

2.1-2

Right-of-way timber shall not be decked within the grubbing limits or in locations that interfere with construction of the road prism or impede drainage.

SECTION 3 – GRUBBING

3-1

All stumps shall be removed that fall between grubbing limits shown on the TYPICAL SECTION SHEET. Those outside the grubbing limits but with undercut roots shall also be removed. Stumps over 22 inches diameter shall be split. Stumps over 40 inches shall be quartered.

3-2

Grubbing limits are defined as the entire area between the external limits shown on the TYPICAL SECTION SHEET.

SECTION 4 - DEBRIS DISPOSAL AND REMOVAL

4.1-1

Right-of-way debris is defined as all vegetative material larger than one cubic foot in volume within the clearing limits.

4.1-2

All right-of-way debris disposals shall be completed prior to the application of rock and/or timber haul.

4.2.3-1

Right-of-way debris shall be scattered outside the grubbing limits.

4.2.3-2

Right-of-way debris shall not be placed against standing timber.

SECTION 5 - EXCAVATION

5.1-1

Unless controlled by construction stakes or specific design sheets herein, roads shall be constructed or reconstructed in accordance with dimensions shown on the TYPICAL SECTION SHEET. On the CG-2020 Road shall be widened in "through-cut" sections to meet 18-ft subgrade width plus 3 foot ditches.

5.1-3

Road grade and alignment shall conform to the State's marked location. Grade and alignment shall have smooth continuity without abrupt changes in direction. Maximum grades are18 percent favorable and 12 percent adverse or as specified on drawings. Minimum radius curve is 60 feet.

5.1-5

Curve widening, where required, shall be added to the inside of curves.

5.1-7

Roads shall be constructed or reconstructed to the dimensions shown on the TYPICAL SECTION SHEET, within the tolerance listed below. Tolerance classes for each road are listed on the TYPICAL SECTION SHEET.

Tolerance Class	A	B	C
Road Width (feet)	+1.5	+1.5	+2.0
Subgrade elevation (feet +/-)	0.5	1.0	2.0
Centerline alignment (feet lt./rt.)	1.0	1.5	3.0

5.1-8

Excavation slopes shall be constructed no steeper than shown on the following table except as construction staked or designed:

Material Type	Excavation Slope Ratio
Common Earth (on side slopes of 55%)	1:1
Common Earth (55% to 70% sideslopes)	¾:1
Common Earth (on slopes over 70%)	½:1
Fractured or loose rock	½:1
Hardpan or solid rock	¼:1

5.1-9

Excavation and embankment slopes shall be constructed to a uniform line and left rough for easier revegetation.

5.1-10

Embankments shall be widened as follows:

Height at Centerline	Subgrade Widening
Less than 6 feet	2 feet
6 feet or over	4 feet

5.1-11

Embankment slopes shall be constructed no steeper than shown on the following table:

Material Type	Embankment Slope Ratio
Common Earth and Rounded Gravel	1½:1
Angular Rock	1¼:1
Sandy Soils	2:1

5.1-12

Organic material shall be excluded from embankment as shown on the TYPICAL SECTION SHEET and from waste material deposited on slopes in excess of 40 percent.

5.1-14

Where side slopes exceed 45 percent, full bench construction shall be utilized for the entire subgrade width.

5.1-17

Turnouts shall be intervisible with a maximum of 1,000 feet between turnouts unless shown otherwise on drawings.

5.1.1-2

Waste material shall not be deposited within 50 feet of a live stream.

5.1.1-3

Waste material may be deposited adjacent to the road prism on side slopes up to 45 percent if the waste material is compacted and more than 100 feet away from live streams. On side slopes of 45 percent or more, all excavation shall be end hauled or pushed to designated embankment sites. All waste embankments shall be compacted in horizontal layers not exceeding 2 feet.

5.2-1

Road pioneering operations shall not undercut the final cut slope, deposit excavated material outside the clearing limits, or restrict drainage.

5.3-1

All embankment and waste material shall be compacted. The minimum acceptable compaction is achieved by placing embankments in 2 foot or shallower lifts and routing excavation equipment over entire width of the lifts. Side hill embankments too narrow to accommodate excavation equipment may be placed by end-dumping or side casting until sufficiently wide to support the equipment.

5.4-1

Silt-bearing runoff shall not be permitted to go into streams.

5.4-3.1

Purchaser shall furnish and evenly spread the seed mixture listed below on all exposed soil inside the grubbing limits at a rate of 40 pounds per acre. The date of application is subject to approval by the Contract Administrator.

Mixture Percent by Weight	Minimum Percent Germination
50% Fescue, Red	90% Germination
25% Ryegrass, Perennial	90% Germination
15% Bentgrass	85% Germination
10% Clover, White and White Dutch (inoculated)	90% Germination

Weed seed shall not exceed 0.5% by weight.

Fertilizer shall be applied at a rate of 100 lbs per acre, and shall consist of 16-16-16 or other approved balanced mix.

Seed shall be furnished in standard containers on which the following shall be shown:

1. Common name of seed
2. Net weight
3. Percent of purity
4. Percentage of germination
5. Percentage of weed seed and inert material

5.5-5

Finished subgrade shall be crowned as shown on the TYPICAL SECTION SHEET, and shall be uniform, firm, rut-free, and shaped to ensure surface runoff in an even, unconcentrated manner.

SECTION 6 - DRAINAGE

6.1-1

On the following roads, road surfaces shall be outsloped at 6 inches in 10 feet.

Road	Stations
CG-2024A	0+00 to 1+73
Spur A	0+00 to 8+17
Spur B	0+00 to 5+14
Spur C	0+00 to 3+67
Spur E	0+00 to 15+46

6.2.1-1

Purchaser shall furnish, install, and maintain galvanized culverts AASHTO Specification No. M-36 corrugated polyethylene pipe (AASHTO specification No. M-294 Type S) and on culverts over 24 inches, aluminized culverts (meeting ASTM A 819, AASHTO M-274 aluminized steel Type 2 and AASHTO M-36 specifications) as designated on the CULVERT LIST. Culvert and flume lengths shall be varied to fit as-built conditions subject to written approval by the Contract Administrator.

6.2.1-2

Annular corrugated bands and culvert ends shall be used on metal culverts. On culverts 24 inches and smaller, bands shall have a minimum width of 12 inches, on culverts over 24 inches, bands shall have a minimum width of 24 inches. Manufacturer's approved connectors shall be used for corrugated polyethylene pipe.

6.2.2.1-1

Culvert, downspout, flume, and energy dissipater installation shall be in accordance with CULVERT AND DRAINAGE SPECIFICATION DETAIL

6.2.2.3-1

Cross drains and surface culverts on road grades in excess of 3% shall be skewed at least 30 degrees from perpendicular to the road centerline , except that cross drain culverts at the low points of dips in roads shall not be skewed.

6.2.2.3-2

Cross drain culverts shall be installed at a slope steeper than the incoming ditch grade, but not less than 3% nor more than 10%.

6.2.2.4-1

Installations of culverts 30 inches in diameter and over shall be subject to written approval by the Contract Administrator or prior to making backfill.

6.2.2.5-1

Drainage structure outfalls shall not terminate directly on unprotected soil that will erode. Downspouts, flumes, and energy dissipators shall be installed to prevent erosion.

6.3-1

Ditches shall be constructed concurrently with construction of the subgrade. Ditches shall drain to culverts, ditchouts, and natural drainages.

6.4-1

Catch basins shall be constructed to resist erosion in accordance with CULVERT AND DRAINAGE SPECIFICATION DETAIL. Minimum dimensions: two feet wide and four feet long with backslopes consistent with Clause 5.1-8: Excavation Slopes.

6.5-1

Headwalls shall be constructed in accordance with CULVERT AND DRAINAGE SPECIFICATION DETAIL at all cross drain culverts except for temporary culverts.

SECTION 7 - ROCK

7.1-1

Rock for construction and/or reconstruction under this contract may be obtained from a source on State land as listed below at no charge to the Purchaser. Development and use shall be in accordance with a written "Development Plan" prepared by the State. A copy of the written plan is available upon request from the Pacific Cascade Region office. Upon completion of operations, the rock source shall be left in the condition specified in said plan, subject to approval by the Contract Administrator. Use of material from any other source must have prior written approval from the Contract Administrator. If other operators are using or desire to use this rock source, a joint operating plan shall be developed. All parties shall follow this plan.

Source	Location
Blue Lake Pit	Section 9, T2N, R7E, W.M.

7.1-3

All rock source operations shall be conducted as directed by the Contract Administrator and in accordance with an approved development plan to be furnished by the Purchaser or on file at the Pacific Cascade Region office.

7.1-6

Rock for construction or reconstruction under this contract may be obtained from any commercial source as approved in writing by the Contract Administrator.

7.2.1-1

Pitrun rock will meet the following specifications for gradation when placed on the subgrade:

No more than 10% of the rock shall be larger than 8 inches in any dimension and no rock shall be larger than 12 inches in any dimension.

7.2.1-2

Purchaser shall manufacture 500 cubic yards truck measure of 3 INCH JAW RUN rock.

7.2.1-4

3 INCH JAW RUN rock shall meet the following specifications for gradation. The Contract Administrator will determine the exact point of evaluation for conformance to specifications.

% Passing 3" square sieve..... 100%
35% shall have fractured surface.

All percentages are by weight.

7.2.1.2-2

3 INCH JAW RUN rock shall contain no more than 5 percent by weight of vegetative debris, dirt, or trash.

7.2.3-1

Measurement of the 3 INCH JAW RUN rock shall be on a cubic yard truck measure basis. Each truck box shall be measured by the Contract Administrator prior to rock hauling. The Purchaser shall provide and maintain load tally sheets for each truck and shall give them to the Contract Administrator upon request.

7.4.2-1

Apply at least the minimum required rock quantity as shown on the ROCK LIST. Rock application on optional roads is not required as long as hauling is done during dry weather conditions. If purchaser elects to haul during wet weather conditions, then rock application is required and shall meet the specifications on the ROCK LIST.

7.4.2-5

On all roads the subgrade shall be approved, in writing, by the Contract Administrator prior to application of rock.

7.4.2-10

Each lift of rock shall be crowned as shown on TYPICAL SECTION SHEET, and shall be uniform, firm, rut-free, and shaped to ensure surface runoff in an even, unconcentrated manner.

7.4.3-5

Rock shall be spread and compacted full width in lifts not to exceed 12 inches uncompacted depth, .Bladed rock shall be wind-rowed to the center of the road and compacted. Compaction shall be by vibratory grid roller (Elliot grid meets this specification) weighing at least 20,000 pounds. At least four complete passes at a maximum speed of 10 mph shall be made prior to reshaping the surface.

7.4.4-1

Riprap shall consist of angular stone, concrete in sacks, or concrete slabs placed on shoulders, slopes, as indicated in this plan, as shown on the TYPICAL SECTION SHEET or as directed by the Contract Administrator.

Loose Riprap - The stone for loose riprap shall be hard, sound and durable. It shall be free from segregation, seams, cracks, and other defects tending to destroy its resistance to weather. Loose riprap shall be free of rock fines, soil, or other extraneous material.

a. Heavy Loose Riprap - Shall meet the following requirements for grading:

At Least/Not More Than	Minimum Size	Maximum Size
40% / 90%	1 Ton (½ cu. yd.)	--
70% / 90%	300 lbs. (2 cu. ft.)	--
10% / 30%	--	50 lbs.

b. Light Loose Riprap - Shall meet the following requirements for grading:

At Least/Not More Than	Size Range	Maximum Size
20% / 90%	300 lbs. to 1 ton	--
80% / --	50 lbs. to 1 ton	--
10% / 20%	--	50 lbs.

7.4.4-2

Riprap shall be set in place in conjunction with or immediately following construction of the embankment. Placement shall be by zero drop height methods only.

SECTION 9 - ROAD AND LANDING DEACTIVATION

9.1-1

The following roads shall be deactivated by the Purchaser within 30 days following completion of timber harvest.

Road	Stations
CG-2022	0+00 to 54+14
CG-2022A	0+00 to 20+26
CG-2022B	0+00 to 7+91
CG-2024A	0+00 to 1+73
Spur A	0+00 to 8+17
Spur B	0+00 to 5+14
Spur C	0+00 to 3+67
Spur E	0+00 to15+46

9.1-2

Deactivation shall consist of:

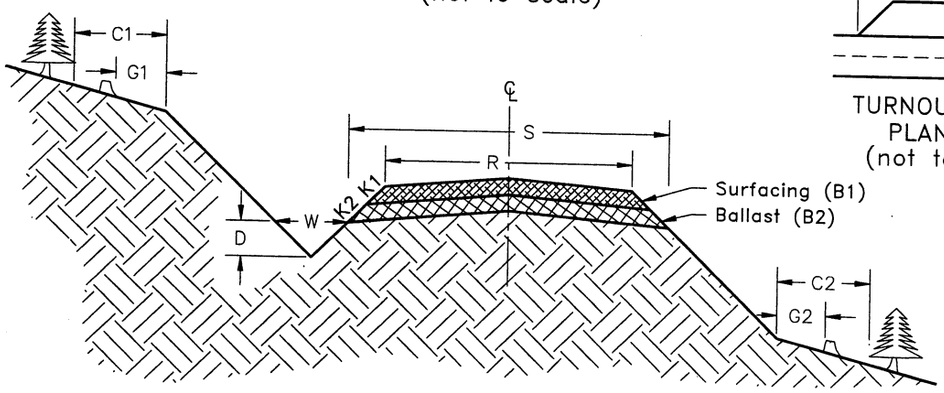
Constructing non-drivable water bars in conformance with the attached NON-DRIVABLE WATER BAR DETAIL at a maximum spacing which will produce a vertical drop of no more than 10 feet between water bars or between natural drainage paths and with a maximum spacing of 100 feet;
skewing water bars at least 30 degrees from perpendicular to the road centerline on roads in excess of 3% grade;
keying water bars into ditchline;
construction of tank trap barriers in conformance with the attached "T" TANK TRAP DETAIL;
filling the ditches;
removal of culverts and disposal from State Land;
providing grass seed and fertilizer on all exposed soil per Clause 5.4.3-1;
removing embankments and shaping banks to conform with the natural ground.

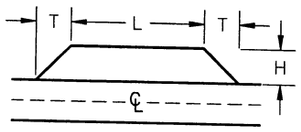
9.2-1

Purchaser shall reduce or relocate landing debris, in a manner approved, in writing, by the Contract Administrator, to avoid landing failures and potential debris slides.

TYPICAL SECTION SHEET

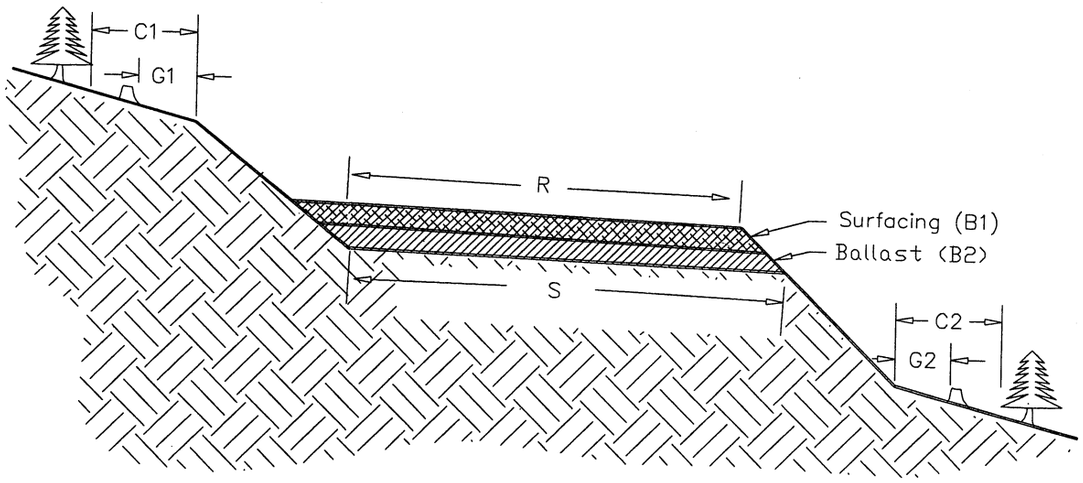
ROAD CROSS-SECTION
(not to scale)





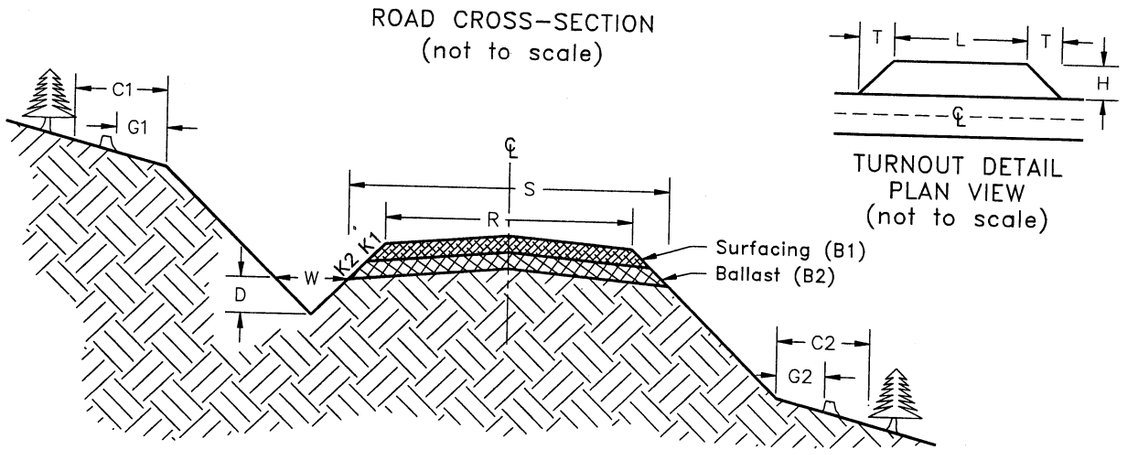
TURNOUT DETAIL
PLAN VIEW
(not to scale)

OUTSLOPED
ROAD CROSS-SECTION
(not to scale)



Road Number	From Station	To Station	Tolerance Class	Subgrade Width	Road Width	Ditch		Crown in. @ CL	Grubbing Limits		Clearing Limits	
						Width	Depth					
				S	R	W	D		G1	G2	C1	C2
CG-2020	MP 0.00	MP 5.11	C	18'	12'	3'	1'	4"	2'	2'	Marked trees	
CG-2022	0+00	54+14	C	--	10'	2'	1'	4"	--	--	--	--
CG-2022A	0+00	20+26	C	--	10'	2'	1'	4"	--	--	--	--
CG-2022B	0+00	7+91	C	--	10'	2'	1'	4"	--	--	--	--
CG-2024	0+00	9+91	C	--	10'	2'	1'	4"	--	--	--	--
CG-2024A	0+00	1+73	C	16'	10'	outslope			--	--	R/W tags	
Spur A	0+00	8+17	C	16'	10'	outslope			--	--	R/W tags	
Spur B	0+00	5+14	C	16'	10'	outslope			--	--	R/W tags	
Spur C	0+00	3+67	C	16'	10'	outslope			--	--	R/W tags	
Spur E	0+00	15+46	C	16'	10'	outslope			--	--	R/W tags	

ROCK LIST



BALLAST

Road Number	From Station	To Station	Rock Slope	Compacted Rock Depth	C.Y./ Station	# of Stations	C.Y. Subtotal	Rock Source	Turnout		
									Length	Width	Taper
			K2	B2					L	H	T
CG-2022	0+00	54+14	Spot rocking				75	1.			
CG-2022A	0+00	20+26	1:1	10"	44	20.26	892	1.			
CG-2022B	0+00	7+91	1:1	10"	44	7.91	348	1.			
CG-2024A	0+00	1+73	1:1	10"	44	1.73	76	1.			
Spur A	0+00	8+17	1:1	10"	44	8.17	360	1.			
Spur B	0+00	5+14	1:1	10"	44	5.14	226	1.			
Spur C	0+00	3+67	1:1	10"	44	3.67	162	1.			
Spur E	0+00	15+46	1:1	10"	44	15.46	680	1.			
Turnouts				10"	44	2	88	1.			
Landings					50	12	600	1.			
Riprap							30	1.			

BALLAST TOTAL 3,545 Cubic Yards

Road Number	From Station	To Station	Rock Slope	Compacted Rock Depth	C.Y./ Station	# of Stations	C.Y. Total	Rock Source
			K1	B1				
CG-2020	MP 0.00	MP 5.11	1:1	3 INCH JAW RUN Spot rocking			500	Blue Lake Pit

SURFACE TOTAL 500 Cubic Yards

NOOTKA THINNING

ROAD PLAN OVERVIEW MAP

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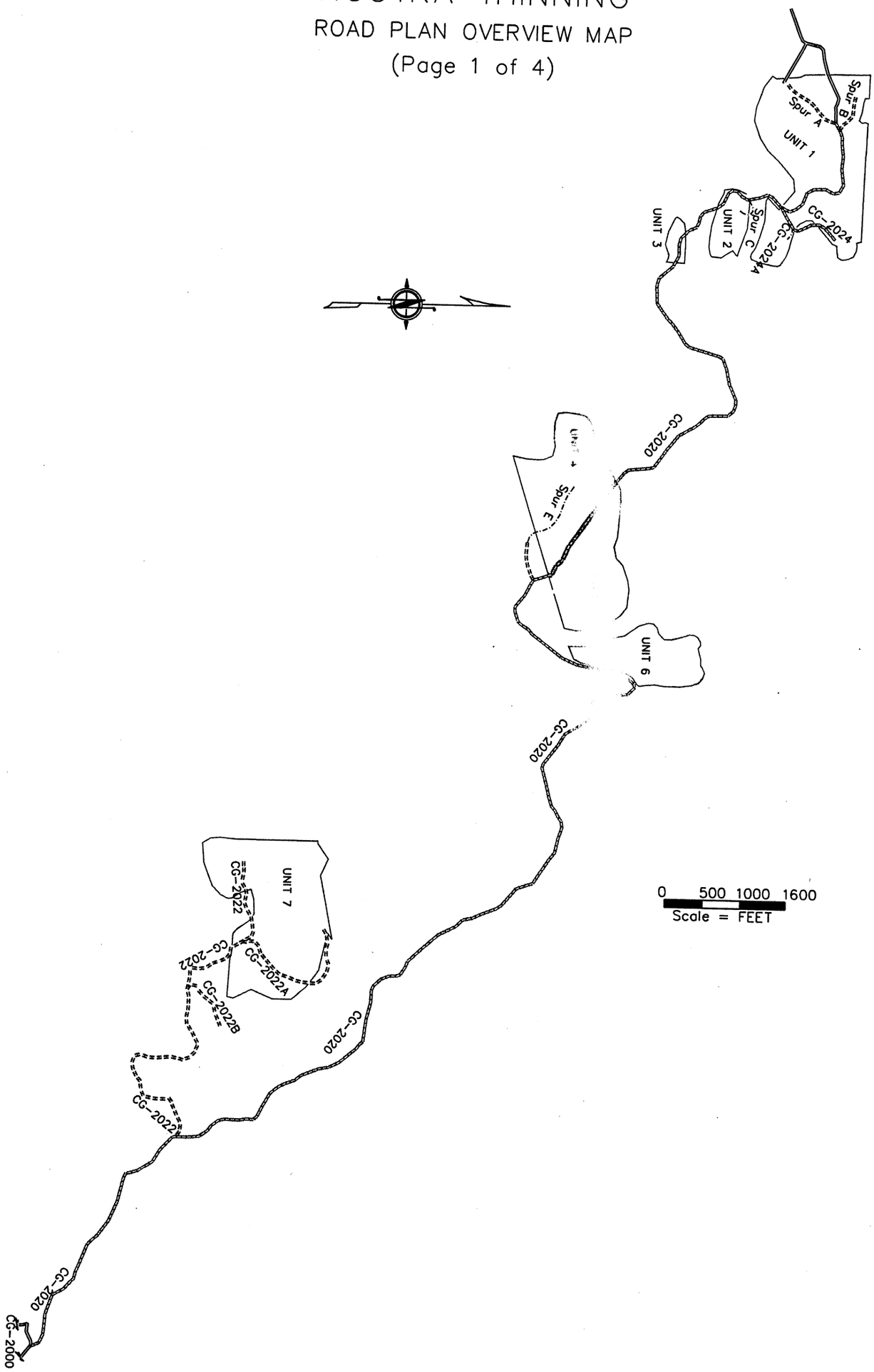

NOOTKA THINNING

ROAD PLAN MAP

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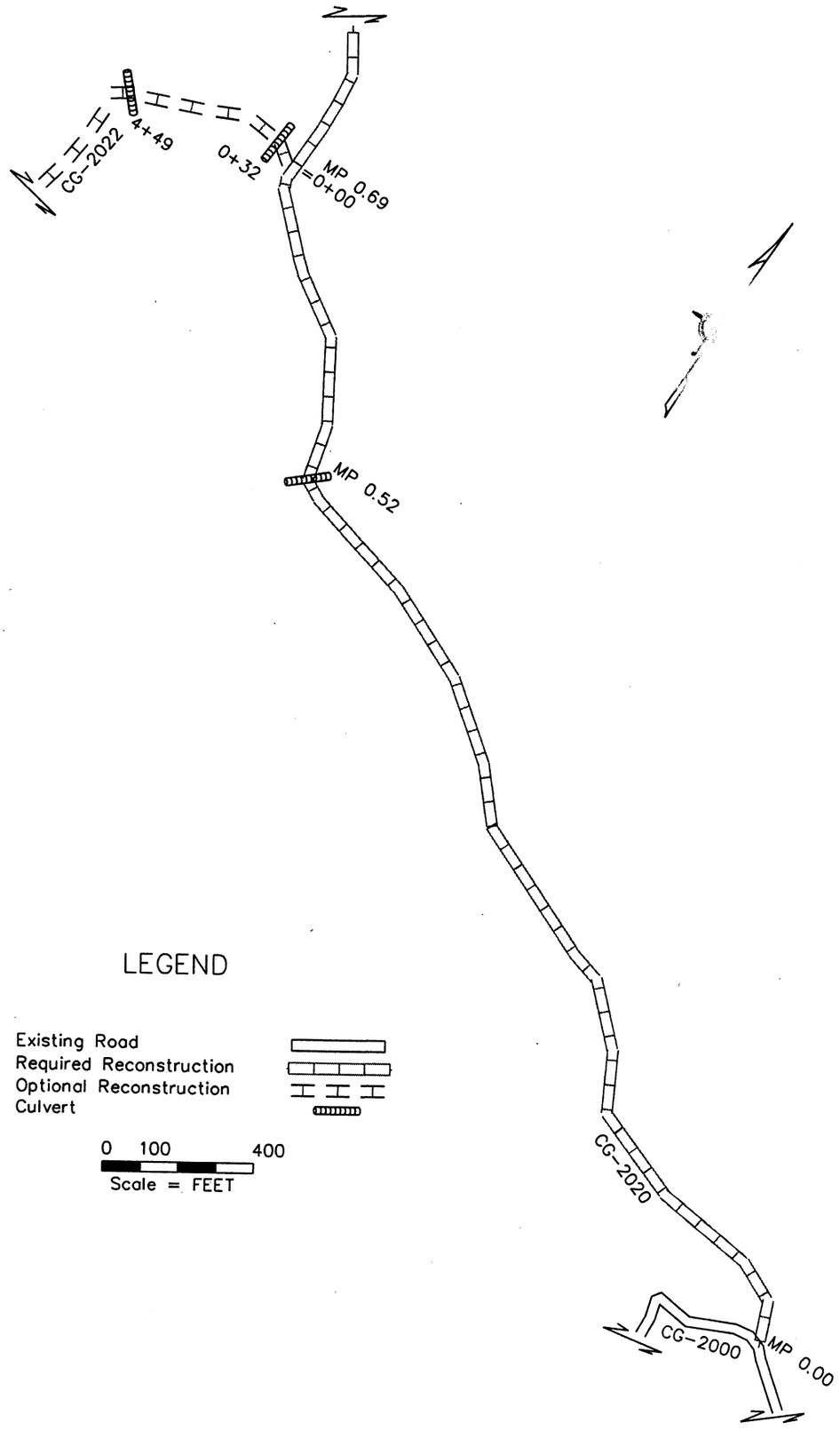

NOOTKA THINNING

ROAD PLAN MAP

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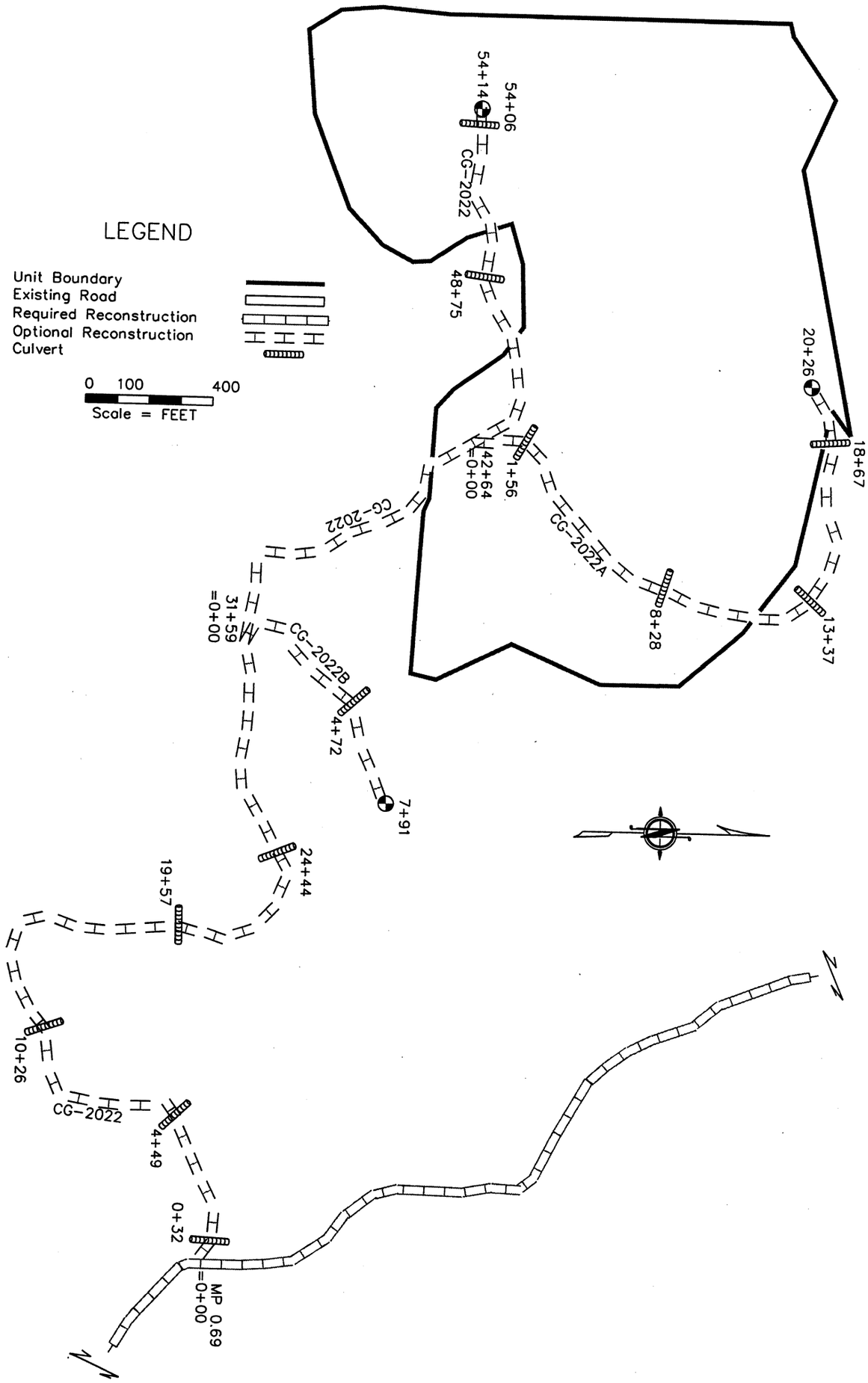

NOOTKA THINNING

ROAD PLAN MAP

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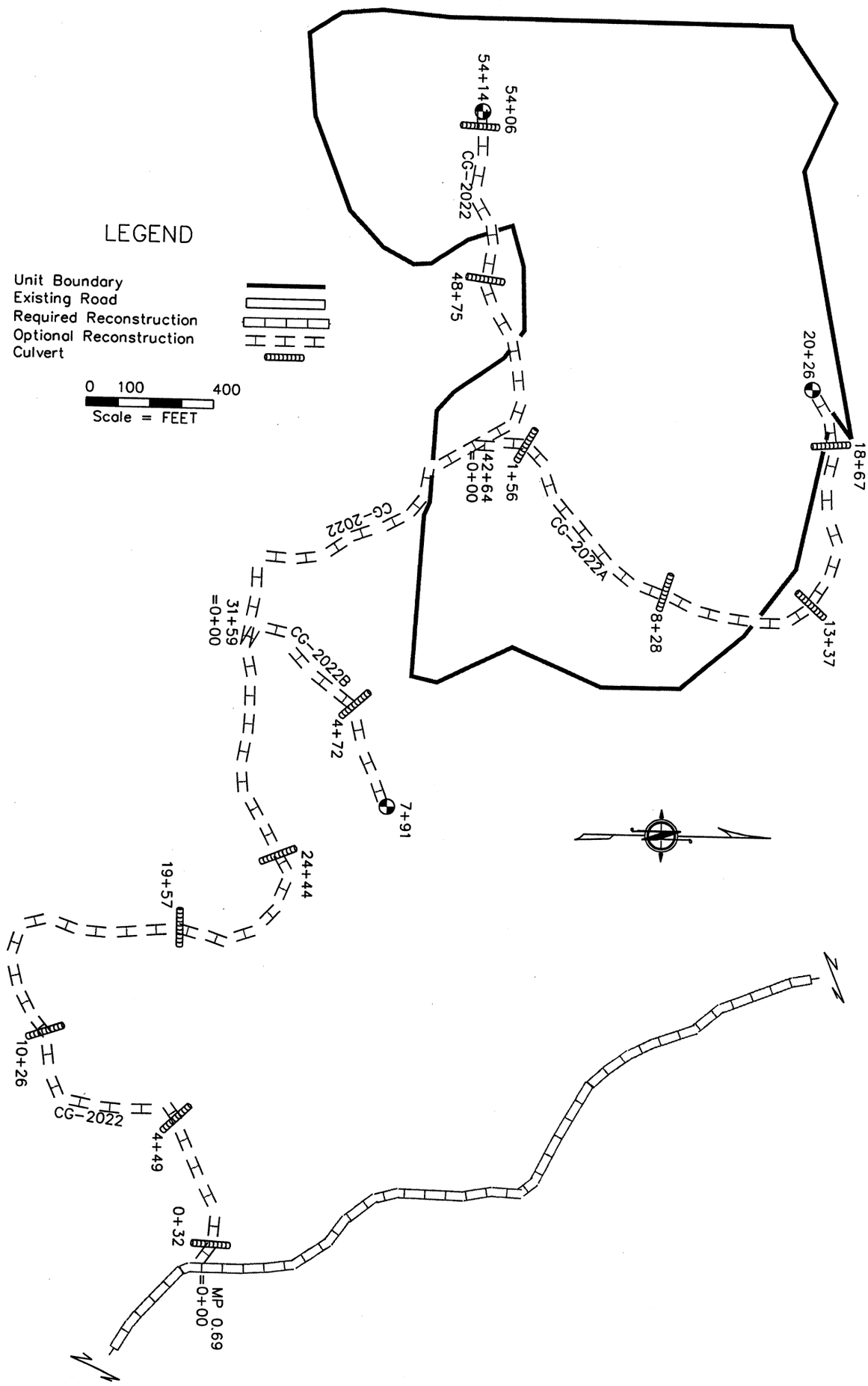

NOOTKA THINNING

ROAD PLAN MAP

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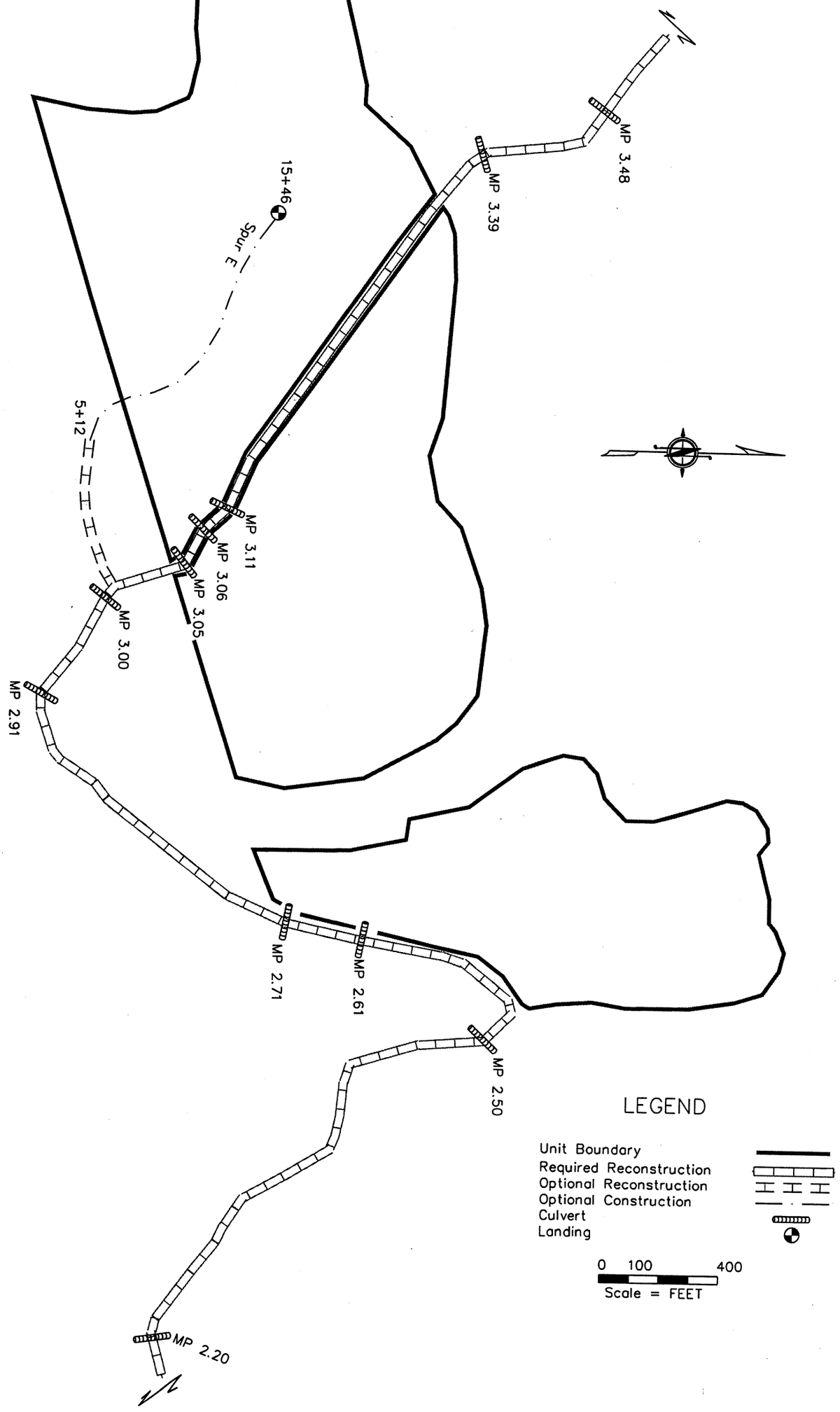

NOOTKA THINNING

ROAD PLAN MAP

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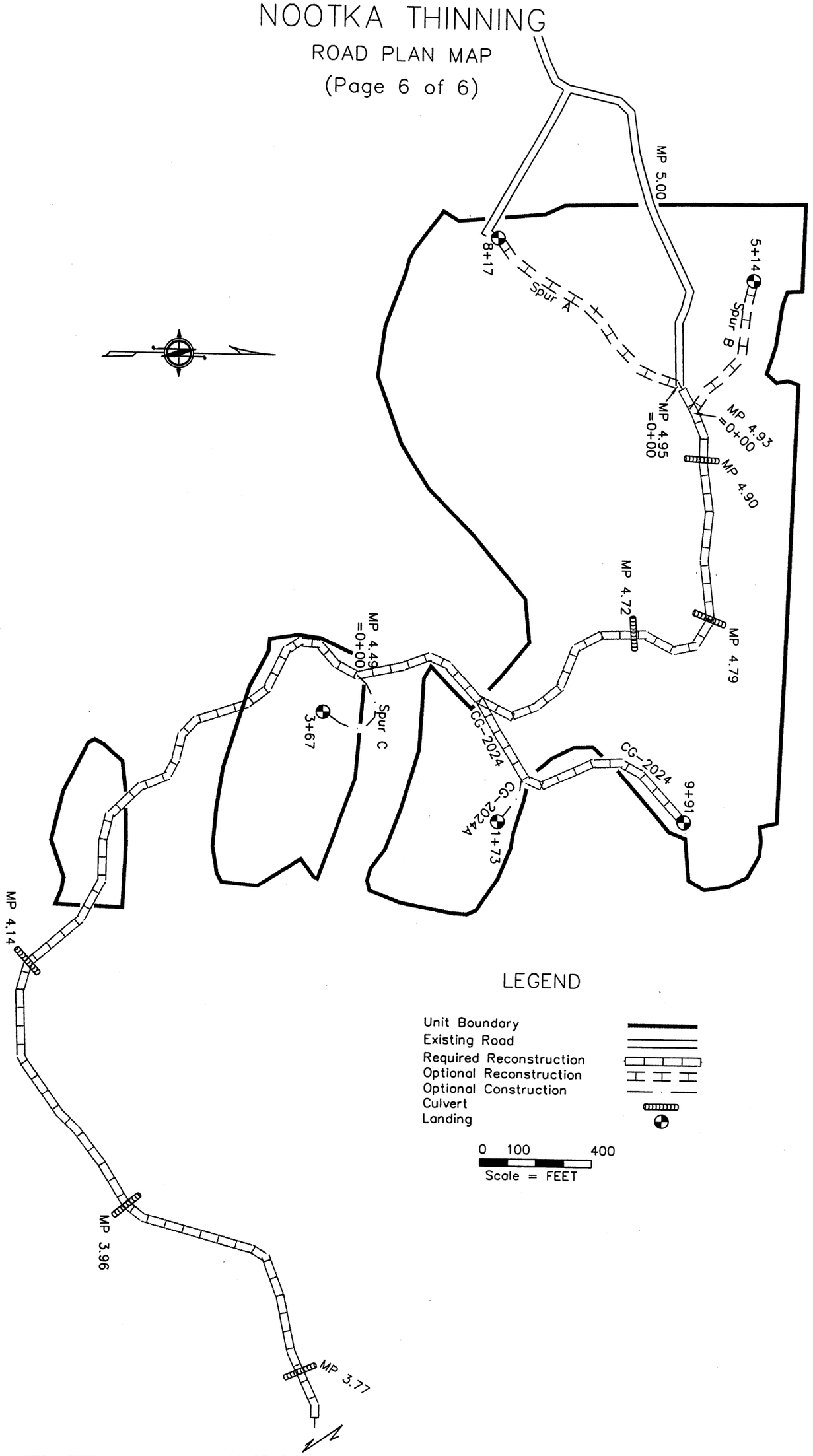
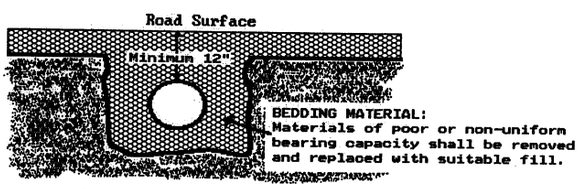


CULVERT LIST

Road Number	Location	Culvert Dia.	Culvert Gauge	Length (ft) Culvert	Downspt	Flume	Riprap (C.Y.) Inlet	Outlet	Type	Backfill Material	Placement Method	Const. Staked	Remarks
			If Steel										
CG-2020	MP 0.52	18"	16	36	-	-	½	½	LL	NT	-	-	
	MP 1.15	18"	16	26	-	-	½	½	LL	NT	-	-	
	MP 1.31	18"	16	26	-	-	½	½	LL	NT	-	-	
	MP 1.41	24"	16	30	-	-	1	1	LL	NT	-	-	
	MP 1.85	18"	16	26	-	-	½	½	LL	NT	-	-	
	MP 1.98	18"	16	34	-	-	½	½	LL	NT	-	-	
	MP 2.09	18"	16	28	-	-	½	½	LL	NT	-	-	
	MP 2.20	18"	16	32	-	-	½	½	LL	NT	-	-	
	MP 2.50	18"	16	26	-	-	½	½	LL	NT	-	-	
	MP 2.61	18"	16	26	-	-	½	½	LL	NT	-	-	
	MP 2.71	18"	16	26	-	-	½	½	LL	NT	-	-	
	MP 2.91	18"	16	26	-	-	½	½	LL	NT	-	-	
	MP 3.00	30"	14	30	-	-	1	1	LL	NT	-	-	
	MP 3.05	30"	14	30	-	-	1	1	LL	NT	-	-	
	MP 3.06	24"	16	30	-	-	1	1	LL	NT	-	-	
	MP 3.11	36"	14	36	-	-	1	1	LL	NT	-	-	
	MP 3.39	18"	16	26	-	-	½	½	LL	NT	-	-	
	MP 3.48	30"	14	32	-	-	1	1	LL	NT	-	-	
	MP 3.77	18"	16	32	-	-	½	½	LL	NT	-	-	
	MP 3.96	18"	16	26	-	-	½	½	LL	NT	-	-	
	MP 4.14	18"	16	26	-	-	½	½	LL	NT	-	-	
	MP 4.72	24"	16	34	-	-	1	1	LL	NT	-	-	
	MP 4.79	18"	16	36	-	-	½	½	LL	NT	-	-	
	MP 4.90	18"	16	32	-	-	½	½	LL	NT	-	-	
CG-2022	0+32	18"	16	34	-	-	-	-	-	NT	-	-	
	4+49	18"	16	66	-	-	-	-	-	NT	-	-	
	10+26	18"	16	36	-	-	-	-	-	NT	-	-	
	19+57	18"	16	32	-	-	-	-	-	NT	-	-	
	24+44	18"	16	32	-	-	-	-	-	NT	-	-	
	48+75	18"	16	32	-	-	-	-	-	NT	-	-	
	54+06	18"	16	32	-	-	-	-	-	NT	-	-	
CG-2022A	1+56	18"	16	32	-	-	-	-	-	NT	-	-	
	8+28	18"	16	32	-	-	-	-	-	NT	-	-	
	13+37	18"	16	32	-	-	-	-	-	NT	-	-	
	18+67	18"	16	32	-	-	-	-	-	NT	-	-	
CG-2022B	4+72	18"	16	36	-	-	-	-	-	NT	-	-	
CG-2024	7+83	18"	16	34	-	-	-	-	-	NT	-	-	

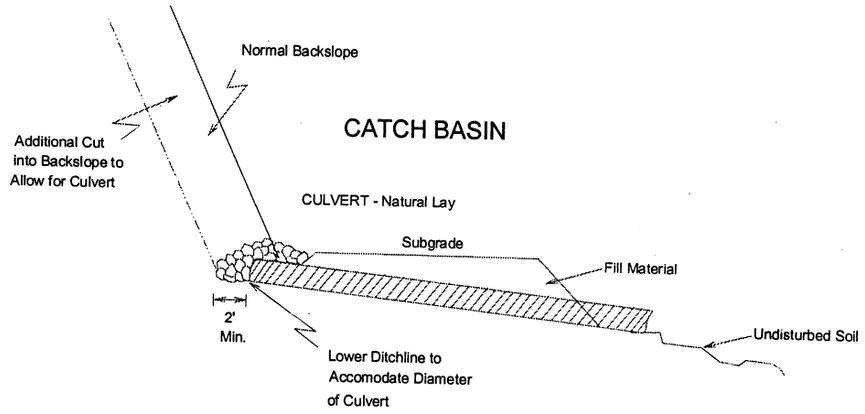
CULVERT BACKFILL AND BASE PREPARATION
(For culverts less than 36")

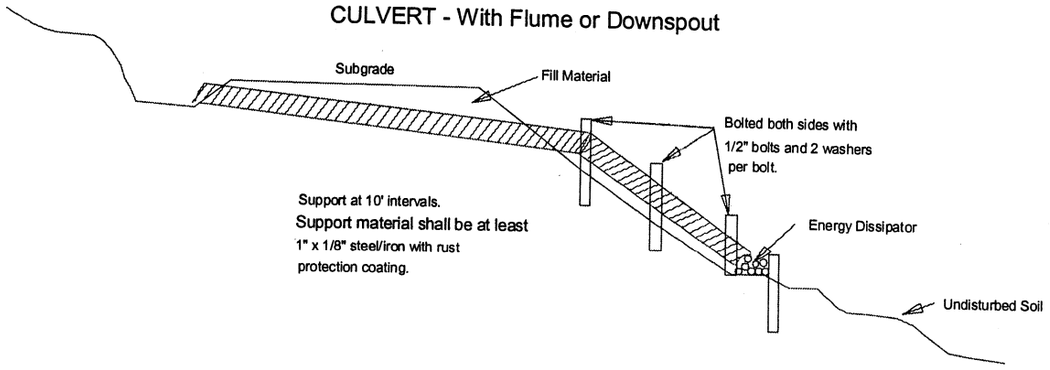


Key:

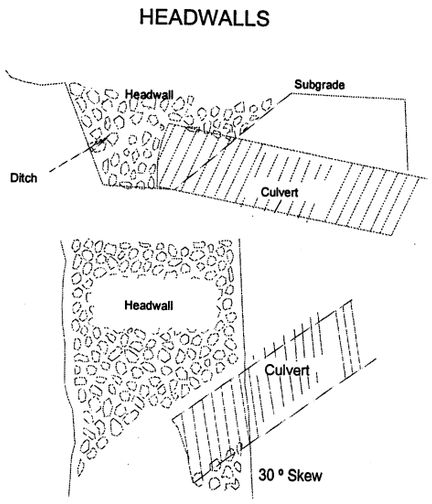
SR - Shot Rock
NT - Native (bank run)
SL - Select Fill
HL - Heavy Loose Riprap
LL - Light Loose Riprap
Flume - Half round pipe
Downspout - Full round pipe

CULVERT AND DRAINAGE SPECIFICATION DETAIL

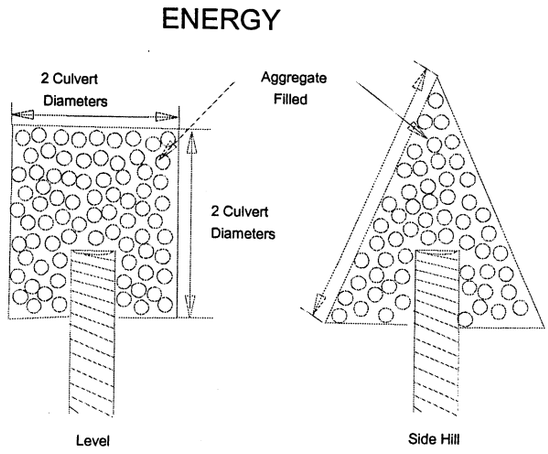




Proper preparation of foundation and placement of bedding material shall precede the installation of all culvert pipe. This includes necessary leveling of the native trench bottom and compaction of required bedding material to form a uniform dense unyielding base. The backfill material shall be placed so that the pipe is uniformly supported along the barrel.



Headwalls to be constructed of material that will resist erosion.



Dissipator Specifications:
Depth: 1 culvert diameter
Aggregate: as specified in the CULVERT LIST.

CULVERT AND DRAINAGE SPECIFICATION DETAIL

(Page 2 of 2)

POLYETHYLENE PIPE INSTALLATION

INSTALLATION REQUIREMENTS:

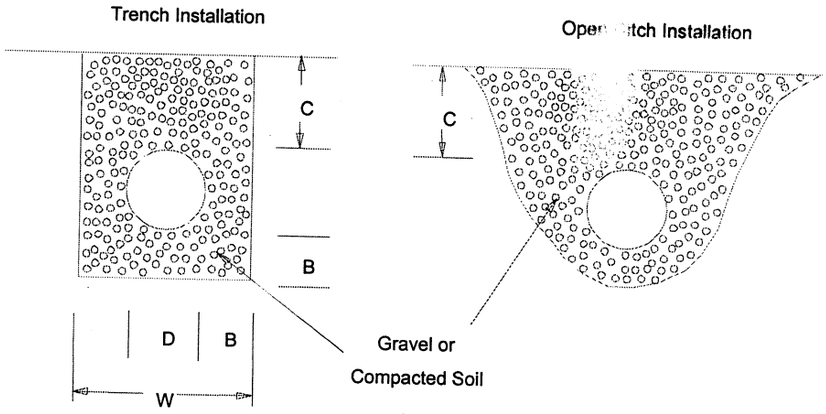
1. Crushed stone, gravel, or compacted soil backfill material shall be used as the bedding and envelope material around the culvert. The aggregate size shall not exceed 1/6 pipe diameter or 4" diameter, whichever is smaller.

2. The corrugated pipe shall be laid on grade, on a layer of bedding material as shown for the two types of installations. If native soil is used as the bedding and backfill material, it shall be well compacted in six inch layers under the haunches, around the sides and above the pipe to the recommended minimum height of cover.

3. Either crushed aggregate or flexible (asphalt) pavement may be laid as part of the minimum cover requirements.

4. Site conditions and availability of bedding materials often dictate the type of installation method used.

5. The load bearing capability of flexible conduits is dependent on the type of backfill material used and the degree of compaction achieved. Crushed stone and gravel backfill materials typically reach a compaction level of 90-95% AASHTO standard density without compaction. When native soils are used as backfill material, a compaction level of 85% is required. This minimum compaction can be achieved by either hand or mechanical tamping.



MINIMUM DIMENSIONS
Trench or Open Ditch Installation

Nominal Diameter	Minimum Thickness	Minimum Cover	Min. Trench Width
D	B	C	W
18"	6"	12"	36"
24"	6"	12"	42"
30"	6"	12"	48"
36"	6"	12"	54"

STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES

FOREST ACCESS ROAD
MAINTENANCE SPECIFICATIONS

1. CONSTRUCTION AND RECONSTRUCTION (Prior to acceptance to the contract or acceptance on a timber sale).

A. Cuts and Fills
   1. Maintain slope lines as constructed. Remove slides from the ditches and roadway. Replace fills to 1½:1 slopes with selected material or as directed. Remove overhanging material from the cut slopes.
   2. Material from slides or other sources requiring removal shall not be deposited in streams or at locations where it will erode into streams or water courses.
   3. Undesirable slide materials and debris shall not be mixed into the surface material.

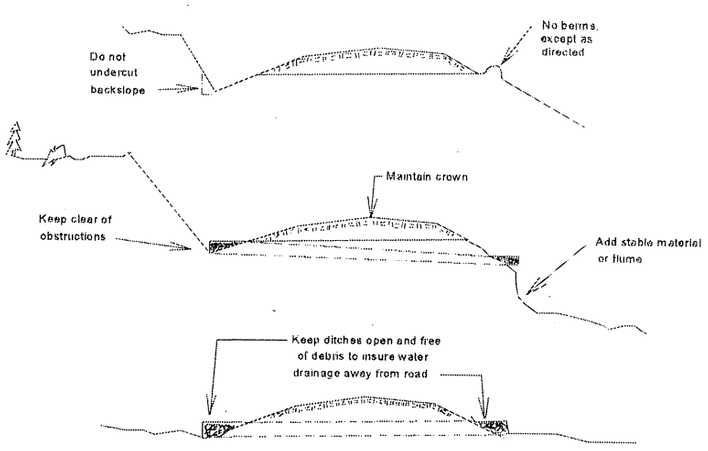
B. Surface
   1. Grade and shape the road surface, turnouts, and shoulders to the original crown, inslope or outslope as directed to provide suitable traveled surface and surface water runoff in an even, unconcentrated manner.
   2. Blading must not undercut the backslope at the bottom of the ditchline or cut geotextile at centerline.
   3. Watering may be required to control dust and to retain fine surface rock.
   4. Desirable surface material shall not be bladed off the roadway.
   5. Replace surface material lost or worn away.
   6. Remove berms except as directed by the State.
   7. Barrel spread soft spots to prevent degradation of geotextile.

C. Drainage
   1. Keep ditches and drainage channels at outlets and inlets of culverts clear of obstructions and functioning as intended.
   2. Inspect and clean culverts at least monthly, with additional inspections during storms and periods of high runoff. This must be done even during periods of inactivity.
   3. Add stable material at the outlet end of the culvert as needed to stabilize the stream bed.
   4. Headwalls: maintain to the road shoulder level with material that will resist erosion.
   5. Keep silt bearing surface runoff from getting into live streams.

D. Structures
   Repair bridges, culverts, cattleguards, fences, and other road structures to the condition required by the construction specifications.

E. Termination of Use or End of Season
   Do maintenance work to minimize damage from the elements such as blading to insure correct runoff, ditch, and culvert cleaning and water bars.

F. Debris
   Remove fallen timber, limbs, and stumps from the slopes or roadway.



LIVE STREAM CULVERT REMOVAL PROCEDURE

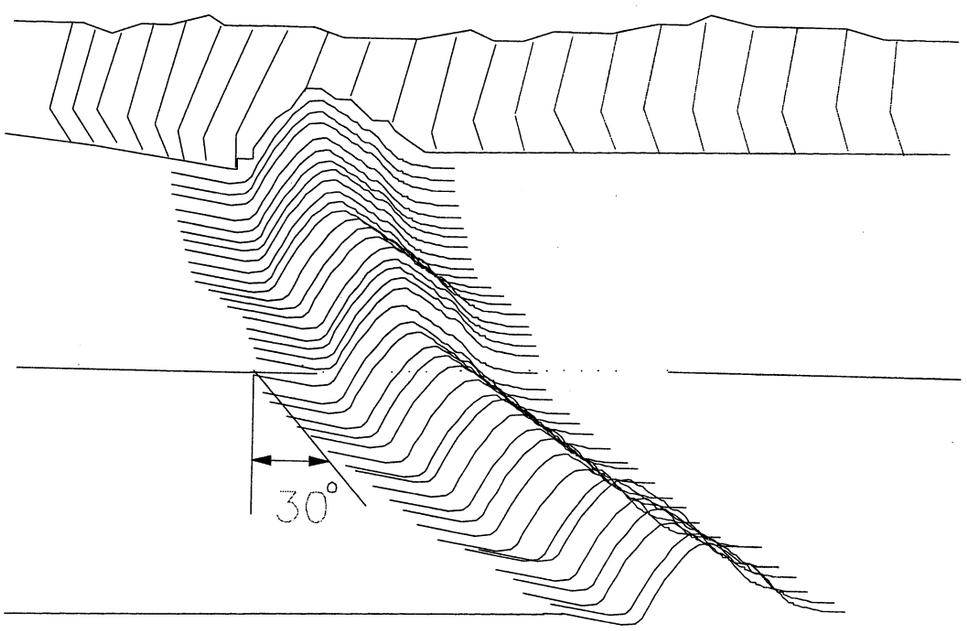
Order of work is as follows, deviations shall be approved, in writing, by the Contract Administrator.

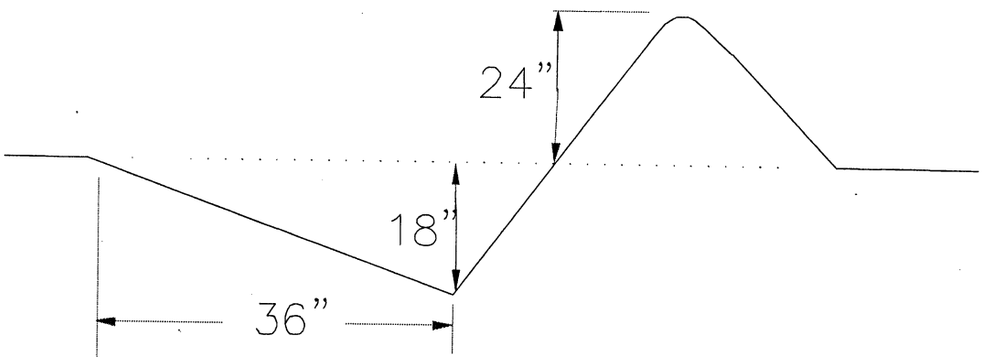
1) Purchaser shall notify the State of intent to start project, and a pre-work conference shall be held before move in of equipment. State will designate a representative that will remain on site at all times when work is being performed in creek channel.
2) Assemble the items on the Materials List onsite before proceeding.
3) Remove 95% of fill and place on stable location for use as backfill. Endhaul debris and fill not suitable for backfill to waste area designated by the Contract Administrator.
4) Set up pumps (2 required, with one as backup). Or use gravity diversion pipe to divert the flow as approved by Contract Administrator.
5) Dam up stream with sandbags and line floor of dam with plastic (to prevent sub-surface water flow), place clean rock on plastic to hold in place, and key leading edge of plastic into channel bottom - see SETTLING POND AND PUMP DETAIL. Build a settling pond at culvert outlet. Fill may need to be removed before the settling pond installation due to space limitations. Pump clean water at catch basin around work site and back into stream. Dirty water shall be pumped away from site and onto forest floor a minimum of 200 feet from live streams. Silt fence shall be erected at base of fill slope and bottom edge of fence shall be keyed into slope and held in place with rocks to prevent water from flowing under the silt fence.
6) Remove remainder of fill and culvert.
7) Cover exposed soils within 100 feet of all live streams with straw (minimum depth of 8 inches) and grass seed.

Materials List:

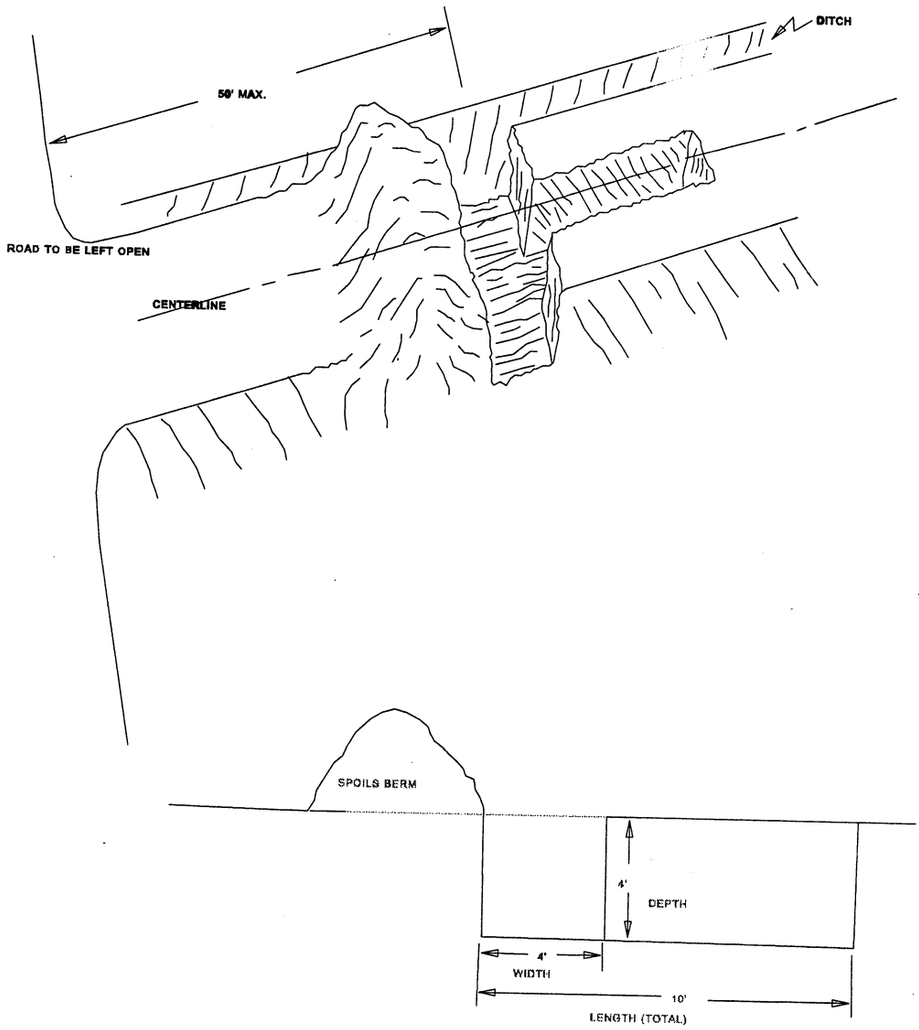
2 pumps, (one as a backup) the clean water pump (dam at culvert catch basin) shall have a minimum capacity of 600 gallons per minute. The dirty water pump (settling pond) and the backup pump shall each have a minimum capacity of 600 gpm. Culvert removal should not start during rain or threat of rain;
400 ft square feet plastic sheet;
20 ft of silt fence and stakes;
6 bales of straw;

NON-DRIVABLE WATER BAR DETAIL

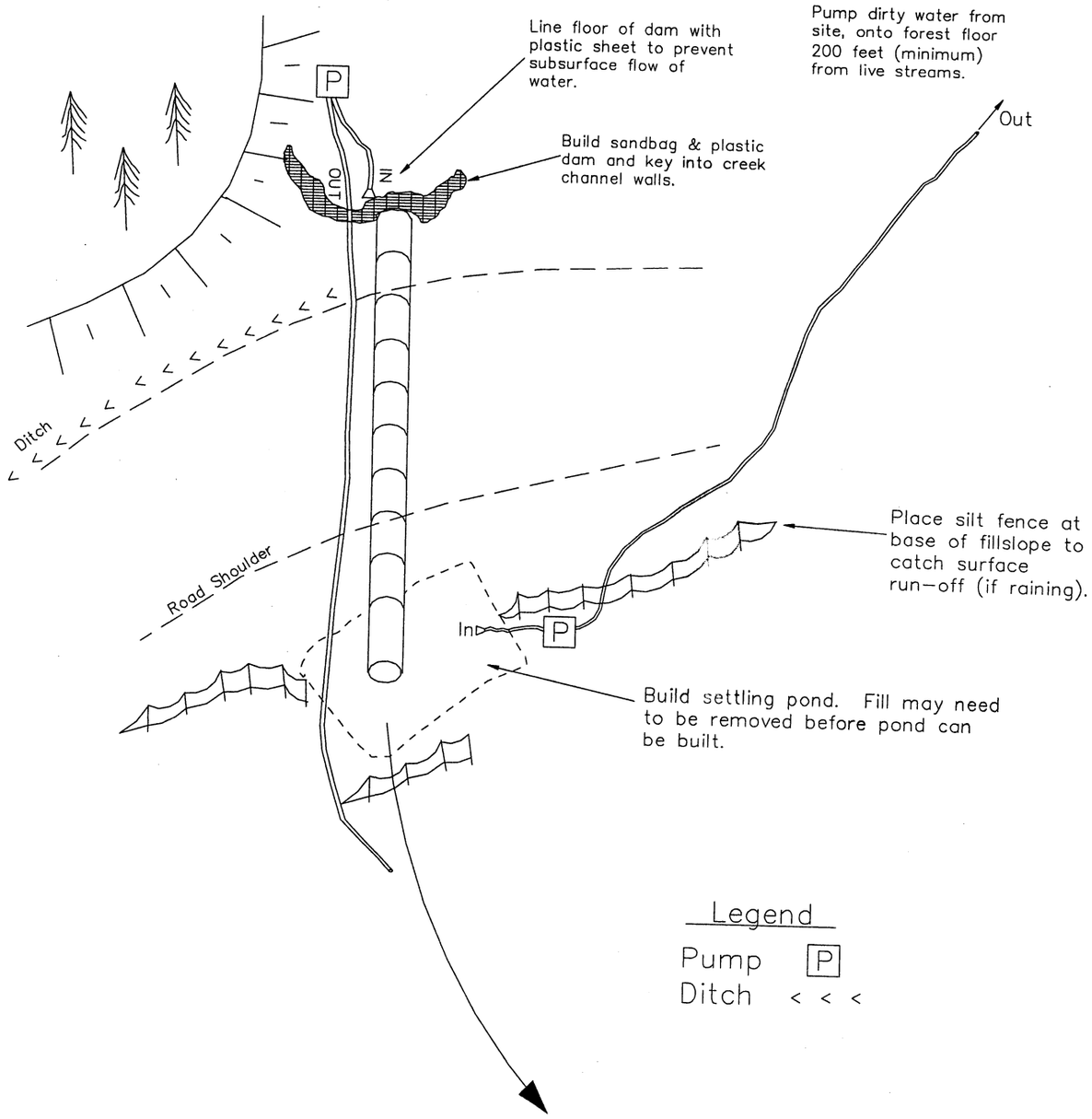




"T" TANK TRAP DETAIL



SETTLING POND AND PUMP DETAIL



ROAD COST SUMMARY

Sale Name Nootka Thinning **Agr. No. 30-0** _____

Compiled by Jim English Date 07/21/04

	Road Cost
Road No. CG-2022, 2022A, 2022B	$ [illegible]6.25
Road No. Spurs C,E, & CG2024A	24,939.71
Road No. Spur A & B	$ 5,297.13
Road No. CG-2020/2024	$ 30,931.33
Road No. _____	$ _____
Road No. _____	$ _____
Road No. _____	$ _____

Total $ **105,294.41**

Acres 213.00
Sale Volume 2,880 $/Mbf **$36.56**

ROAD COSTING FORM

Sale Name Nootka Thinning **Agr. No. 30-** _____ **Road No.** CG-2022, 2022A, 2022E

Compiled by Jim English Date July 21, 2004

No. of Stations 82.31 R/W Width _____

CLEARING & GRUBBING

_____	Cat days:	2	@	$	1000.00	=	$	2000.00	
_____	Excavator days	3	@	$	1000.00	=	$	3000.00	
_____	Revegetation:	82.31	@	$	20.00	=	$	1646.20	
									$ 6,646.20

EXCAVATION

_____	Cat days:	2	@	$	1000.00	=	$	2000.00	
_____	Excavator days	4	@	$	1000.00	=	$	4000.00	
Endhaul volume		500	@	$	1.50	=	$	750.00	
									$ 6,750.00

BALLAST & SURFACING

Depth	yds/sta	X	stations	=	yards
12"	44		28.17		1240
12"	50		1		50
Lndg	50		4		200
Patch	75		1		75
					1565

UNIT COSTS	Ballast	Stockpile	Riprap
Drill & shoot	2.50		
Dig & load	1.00		
Purchase			
Haul	6.08		
Spread	0.80		
Compact	0.45		
Strip/Reclaim			
Crush			
Total	10.83		

Ballast Source: Blue Lake Pit
Surface Source: Blue Lake Pit
Riprap Source: Blue Lake Pit

Ballast	1565	yds @ $	10.83	/yds = $	16948.45		
Stockpile		yds @ $		/yds = $			
Riprap		yds @ $	10.00	/yds = $			
							$ 16,948.45

CULVERTS & FLUMES

G-(Galvanized) P-(Plastic) ED-(energy dissipator) F-(flume)

Diam.	No.	Ga.	Type	Length	Cost/ft	Total
18"	12	16	G	428	12.00	5136.00
24"		16	G		15.00	
42"		14	G		30.00	

$ 5,136.00

ABANDONMENT/ Deactivate

sta 30.15

_____	Excavator days	1.89	@	$	1000.00	
_____			@	$		
						$ 1,890.00

OTHER _____ $ _____

MOVE IN

Dozer	@	$	400.00	
Excav.	@	$	400.00	
2 dump trucks	@	$	200.00	
	@	$		
				$ 1000.00

Cost per Station $ 536.10

GENERAL EXPENSES **Subtotal** $ 38,370.65 Subtotal X 1.15% **Total** $ 44,126.25

ROAD COSTING FORM

Sale Name Nootka Thinning **Agr. No. 30-** _____ **Road No.** Spurs C,E, & CG2024/

Compiled by Jim English Date July 21, 2004

No. of Stations 20.86 R/W Width 45

CLEARING & GRUBBING

_____	Cat days:	1.5	@	$	1000.00	=	$	1500.00	
_____	Excavator days	3	@	$	1000.00	=	$	3000.00	
_____	Revegetation:	20.86	@	$	20.00	=	$	417.20	$ 4,917.20

EXCAVATION

_____	Cat days:	2	@	$	1000.00	=	$	2000.00	
_____	Excavator days	2	@	$	1000.00	=	$	2000.00	
Endhaul volume		_____	@	$	1.50	=	$	0.00	$ 4,000.00

BALLAST & SURFACING

Depth	yds/sta	X	stations	=	yards
12"	44		20.86		917.84
12"	50		1		50
Lndg	50		3		150
					1118
					0
					0
					0

UNIT COST:	Ballast	Stockpile	Riprap
Drill & shoo	2.50		
Dig & load	1.00		
Purchase	0.00		
Haul	5.50		
Spread	0.80		
Compact	0.45		
Strip/Reclaim			
Crush			
Total	10.25	0.00	0.00

Ballast Source: Blue Lake Pit
Surface Source: Blue Lake Pit
Riprap Source: Blue Lake Pit

Ballast	1118	yds @ $	10.25	/yds = $	11459.50		
Stockpile	_____	yds @ $	0.00	/yds = $	0.00		
Riprap	_____	yds @ $	12.00	/yds = $	0.00	$ 11,459.50	

CULVERTS & FLUME G-(Galvanized) P-(Plastic) ED-(energy dissipato F-(flume)

Diam.	No.	Ga.	Type	Length	Cost/ft	Total
18"	0	16	G	0	12.00	0.00
24"	0	16	G	0	15.00	0.00
						0.00
						0.00
						0.00
						0.00
						0.00

$ 0.00

ABANDONMENT/ Deactivate

sta 20.9

_____	Excavator days	1.31	@	$	1000.00	
_____		_____	@	$	_____	$ 1,310.00

OTHER _____ $ _____

MOVE Dozer @ $ _____
Excav. @ $ _____
Jaw @ $ _____
_____ @ $ _____

$ 0.00

Cost per Station $ 1195.58

GENERAL EXPENSES Subtotal $ 21,686.70 Subtotal X 1.15% **Total** $ 24,939.71

ROAD COSTING FORM

Sale Name Nootka Thinning **Agr. No. 30-** _____ **Road No.** Spur A & B

Compiled by Jim English Date July 21, 2004

No. of Stations 13.31 R/W Width 45

CLEARING & GRUBBING

_____	Cat days:	1	@	$	1000.00	=	$	1000.00	
_____	Excavator days	1	@	$	1000.00	=	$	1000.00	
_____	Revegetation:	13.31	@	$	20.00	=	$	266.20	$ 2,266.20

EXCAVATION

_____	Cat days:	1	@	$	1000.00	=	$	1000.00	
_____	Excavator days	0.5	@	$	1000.00	=	$	500.00	
Endhaul volume			@	$		=	$		$ 1,500.00

BALLAST & SURFACING

Depth	yds/sta	X	stations	=	yards
12"	44		13.31		585.64
12"	50				
Lndg	50		2		100
					686

UNIT COSTS	Ballast	Surfacing	Riprap
Drill & shoot	2.50		
Dig & load	1.00		
Purchase			
Haul	6.12		
Spread	0.80		
Compact	0.45		
Strip/Reclaim			
Crush			
Total	10.87		

Ballast Source: Blue Lake Pit
Surface Source: Blue Lake Pit
Riprap Source: Blue Lake Pit

Ballast	_____	yds @ $	10.87	/yds = $	_____		
Surface	_____	yds @ $	_____	/yds = $	_____		
Riprap	_____	yds @ $	7.50	/yds = $	_____	$ _____	

CULVERTS & FLUMES G-(Galvanized) P-(Plastic) ED-(energy dissipator) F-(flume)

Diam.	No.	Ga.	Type	Length	Cost/ft	Total
18"		16	G		12.00	
24"		16	G		15.00	

$ _____

ABANDONMENT/ Deactivate

sta 13.31

_____	Excavator days	0.84	@	$	1000.00	
_____		_____	@	$	_____	$ 840.00

OTHER _____ $ _____

MOVE IN

_____	@	$	_____
_____	@	$	_____
_____	@	$	_____
_____	@	$	_____

$ _____

Cost per Station $ 397.98

GENERAL EXPENSES **Subtotal** $ 4606.20 Subtotal X 1.15% **Total** $ 5,297.13

ROAD COSTING FORM

Sale Name Nootka Thinning **Agr. No. 30-** _____ **Road No.** CG-2020/2024

Compiled by Jim English **Date** July 21, 2004

No. of Stations 47.91 Recost. **R/W Width** 45

4.39 mi Pre-Haul Maintenance

CLEARING & GRUBBING

	Cat days:	0.5	@	$	1000.00	=	$	500.00	
	Excavator days	2.5	@	$	1000.00	=	$	2500.00	
	Revegetation:	47.91	@	$	20.00	=	$	958.20	
									$ 3,958.20

EXCAVATION

	Cat days:	1.5	@	$	1000.00	=	$	1500.00	
	Excavator days	1	@	$	1000.00	=	$	1000.00	
Endhaul volume			@	$	1.50	=	$		
									$ 2,500.00

BALLAST & SURFACING

Depth	yds/sta	X	stations	=	yards
12"	44		47.91		2108.04
12"	50				
Lndg	50		3		150
					2259

UNIT COSTS	Ballast	Surfacing	Riprap
Drill & shoot	2.50	2.50	2.50
Dig & load	1.00	1.00	2.00
Purchase			
Haul	6.08	6.08	6.08
Spread	0.80	0.80	0.80
Compact	0.45	0.45	
Strip/Reclaim			
Crush		3.25	
Total	10.83	14.08	11.38

Ballast Source: Blue Lake Pit
Surface Source: Blue Lake Pit
Riprap Source: Blue Lake Pit

Ballast		yds @ $	10.83	/yds = $			
Surface	500	yds @ $	14.08	/yds = $	7039.84		
Riprap	31	yds @ $	11.38	/yds = $	352.77		
						$	7,392.61

CULVERTS & FLUMES

G-(Galvanized) P-(Plastic) ED-(energy dissipator) F-(flume)

Diam.	No.	Ga.	Type	Length	Cost/ft	Total
18"	18	16	G	514	12.00	6168.00
24"	3	16	G	94	15.00	1410.00
30"	3	14	G	92	21.00	1932.00
36"	1	14	G	36	26.00	936.00
						$ 10,446.00

ABANDONMENT/ Deactivate

	sta					
	Excavator days	0.1	@	$	1000.00	
			@	$		
						$ 100.00

OTHER _____ $ _____

MOVE IN

Loader	@	$	
Trucks	@	$	
Jaw	@	$	2500.00
	@	$	
			$ 2,500.00

Cost per Station $ 645.61

GENERAL EXPENSES **Subtotal** $ 26896.81 Subtotal X 1.15% **Total** $ 30,931.33